NPTEL Video Course - Electrical Engineering - NOC:Power Management Integrated Circuits

Subject Co-ordinator - Prof. Qadeer Ahmad Khan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

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Lecture 30 - Hybrid LDO, Short-Circuit Protection
Lecture 31 - Hiccup Mode and Foldback Current Limit
Lecture 32 - Introduction to Switching Regulators
Lecture 33 - volt-second Balance, Non-Idealities in the Power Stage of a Buck Converter
Lecture 34 - Transformer Model of a Buck Converter, Conduction Efficiency, Efficiency of an LDO versus Effici
Lecture 35 - Synchronous versus Non-Synchronous Switching Regulators, PWM Control Techniques
Lecture 36 - Losses in Switching Regulators (Conduction Loss, Gate-Driver Switching Loss)
Lecture 37 - Dead-Time Switching Loss in DC-DC Converters
Lecture 38 - Hard Switching Loss in DC DC Converters
Lecture 39 - Magnetic Loss in DC-DC Converters, Relative Significance of Losses as a Function of the Load Cur
Lecture 40 - Output Voltage Ripple of a Buck Converter
Lecture 41 - Choosing the Inductor and Capacitor for a Buck Converter
Lecture 42 - CCM Vs DCM Operation in DC DC Converters
Lecture 43 - CCM DCM Boundary Condition, Voltage Conversion Ratio in DCM
Lecture 44 - Concept of Pulse Frequency Modulation PFM
Lecture 45 - Classification of Pulse Width Modulators
Lecture 46 - DC - DC Converter Control Techniques, Stability Analysis of Voltage Mode Buck Converter - Part 1
Lecture 47 - Stability Analysis of Voltage Mode Buck Converter - Part 2
Lecture 48 - Stability Analysis of Voltage Mode Buck Converter - Part 3
Lecture 49 - Dominant Pole Compensation (Type-I with Gm-C Architecture)
Lecture 50 - Dominant Pole Compensation (Type-I with Op Amp-RC Architecture)
Lecture 51 - Introduction to Type-II Compensation
Lecture 52 - Type-II Compensator using Gm-C Architecture - Part 1
Lecture 53 - Type-II Compensator using Gm-C Architecture - Part 2
Lecture 54 - Type-II Compensator using Gm-C Architecture - Part 3
Lecture 55 - Type-II Compensator using Op Amp-RC Architecture
Lecture 56 - Introduction to Type-III Compensator
Lecture 57 - Type-III Compensator using Op Amp-RC Architecture
Lecture 58 - Simulation of DC-DC Converter with Type-III Compensator
Lecture 59 - Type-III Compensator using Gm-C Architecture
Lecture 60 - Feed-Forward Line Compensation, Loop Gain Compensation by Modulating Gm
Lecture 61 - Designing a Buck Converter, Power Loss Budgeting
Lecture 62 - Sizing Power MOSFETs
Lecture 63 - Estimating Switching Losses and Choosing the Switching Frequency
Lecture 64 - Choosing Inductance and Capacitance Values
Lecture 65 - Choosing 'C' Depending on Factors that Limit the Load Transient Response
Lecture 66 - Inductor and Capacitor Characteristics, Reducing the Effect of Capacitor ESL
Lecture 67 - Gate Buffer and Non-Overlap Clock Generator in Gate-Driver Circuit
Lecture 68 - Pulse-Width Modulator- Trailing Edge, Leading Edge and Dual Edge; Triangle Wave Generator

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Lecture 69 - Average Ramp Voltage of Single-Edge PW Modulator,Design Considerations of EA
Lecture 70 - Delays Associated with PW Modulator, PFM and PSM Operation, DCM Operation using NMOS
Lecture 71 - Designing a Zero-Cross Comparator, Inverter-Based Auto-Zeroed Comparator, Simulation Demo
Lecture 72 - Current Mode Control- Peak, Valley, Emulated; VMC versus CMC; Sub-Harmonic Oscillation
Lecture 73 - Ramp-Adaptive Slope Compensation to Avoid Current Loop Instability
Lecture 74 - Non-Linear Control of DC-DC Converters, Phase-Shift between i_L and v_C
Lecture 75 - Stabilising a Voltage-Mode Hysteretic Converter using R_esr, Relation between F_sw and the Hyste
Lecture 76 - Hysteretic Converter - Simulation Demo
Lecture 77 - Current-Mode Hysteretic Converter, Using R-C as Ripple Generator
Lecture 78 - Controlling the Switching Frequency of a Hysteretic Converter, Delay in the Hysteretic Comparato
Lecture 79 - Frequency and Voltage Regulation Loops in a Fixed-Frequency Hysteretic Converter
Lecture 80 - Resetting the Capacitor Voltage in a Hysteretic Converter, Constant ON-Time Control
Lecture 81 - Introduction to Boost Converter, RHP Zero in a Boost Converter
Lecture 82 - Introduction to Buck-Boost Converter
Lecture 83 - Tri-Mode Buck-Boost Converter (Buck, Buck-Boost and Boost)
Lecture 84 - Boundary Conditions for Mode Transition in a Tri-Mode Buck-Boost Converter
Lecture 85 - Generating Buck and Boost Duty Cycles in a Tri-Mode Buck-Boost Converter
Lecture 86 - Introduction to Switched-Capacitor DC-DC Converters,Switched-Capacitor DC-DC Converter with V_o
Lecture 87 - Applications of Switched-Capacitor DC-DC Converters in Open-Loop, Regulating the Output using Fe
Lecture 88 - H-Bridge Switched-Capacitor DC-DC Converter,SC DC-DC converter with Multiple Gain Settings
Lecture 89 - Current Sensing Techniques in DC-DC Converters
Lecture 90 - Analog Layout Techniques - Part 1
Lecture 91 - Analog Layout Techniques - Part 2
Lecture 92 - Digital Control of DC-DC Converters, ADC Architectures
Lecture 93 - Digital Pulse-Width Modulator Architectures, Adaptive Compensation
Lecture 94 - Limitations of Analog and Digital Controllers, Time-Based Controller for Buck Converter
Lecture 95 - Time-Based Controller for Buck Converter and for LDO, Issues with Time-Based Control
Lecture 96 - Multi-Phase DC-DC Converters
Lecture 97 - Dynamic Voltage and Frequency Scaling, Single Inductor Multiple Output (SIMO) DC-DC Converter
Lecture 98 - LCD/AMOLED Display Drivers - Part 1
Lecture 99 - LCD/AMOLED Display Drivers - Part 2
Lecture 100 - LCD/AMOLED Display Drivers - Part 3
Lecture 101 - LED Drivers for Camera Flash
Lecture 102 - Li-Ion Battery and its Charging Phases
Lecture 103 - Battery Charger IC

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